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SHORT REPORT

Interventional Management of In-stent Thrombosis after Superior Mesenteric Vein stenting

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Abstract *Introduction:* Mesenteric vein stenosis and thrombosis are rare conditions, without a definite treatment strategy.
Report: A 46 year-old man underwent pancreatic resection with a polytetrafluoroethylene (PTFE) graft vascular reconstruction; he subsequently developed anastomotic mesenteric vein stenosis, which was treated with transhepatic venoplasty and stenting. Three months later, he suffered an in-stent thrombosis, after a reduction in heparin dosage. The thrombosis was successfully managed, after a failed systemic thrombolysis, with a direct thrombolysis via transjugular approach. At 10 months' follow-up, the stent was still patent.
Conclusion: Mesenteric vein stenting is effective on PTFE grafts, but appropriate anticoagulation is helpful to avoid subsequent in-stent thrombosis.

Introduction

Mesenteric vein stenosis and thrombosis are rare conditions, and there is no definite treatment strategy.[1] Percutaneous endovascular treatment, such as transjugular portosystemic shunt, direct and indirect thrombolysis, stenting and mechanical thrombectomy, were described in liver-transplant patients, while much less is known about management of these conditions in the non-transplant population.[2—5] Moreover, because vascular reconstruction with polytetrafluoroethylene (PTFE) graft represents a recent advance in pancreatic surgery, no literature exists about endovascular treatment in these conditions.

Report

A 46-year-old male patient was admitted for worsening ascitis 4 months after total pancreasectomy with PTFE graft vascular reconstruction performed in a different country. He was treated for locally advanced cephalo-pancreatic adenocarcinoma with invasion of superior mesenteric vein. He underwent a neo-adjuvant chemoradiation protocol

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with F-fluorouracil (5FU) c.i. and concurrent radiotherapy (total dose 55 Gy). At surgery, superior mesenteric vein resection and reconstruction with PTFE graft and dissection of the superior mesenteric artery, encased from the tumour, were done; intra-operative radiotherapy (19 Gy isodose) was added. Histology showed vein invasion, pT3, $N1_{7/56}$, M0, and the operation was judged R1.

There was no evidence of disease recurrence. Computed tomography (CT) scan demonstrated two stenoses on proximal and distal anastomosis. Percutaneous transhepatic portography was performed and two stents were placed: a 10 × 40 mm stent (Sentinol, Boston Scientific, Natich, MA, USA) at the proximal edge and a 12 × 50 mm stent (Wallstent, Boston Scientific, Natich, MA, USA) distally (Fig. 1). The ascitic fluid gradually resolved and the patient was discharged 12 days later; low—molecular-weight Heparin (LMWH) 11 400 UI $diem^{-1}$ (Seledie, Glaxo Allen S.p.A, Brentford, Middlesex, UK) was prescribed. Three months later, as the patient required percutaneous radiofrequency (RF) ablation for single focal hepatic metastasis, his anticoagulation therapy was halved to a prophylactic dose of 5700 UI $diem^{-1}$.

Ten days after the anticoagulation therapy was modified, he complained of recurrent ascitis: a new computed tomography (CT) scan showed in-stent venous thrombosis. A systemic thrombolysis with recombinant tissue-plasminogen activator (rt-PA) (Actilyse, Boehringer Ingelheim, Ingelheim am Rhein, Germany) with a single bolus of 10 mg, followed by 90 mg in 2 h, was unsuccessful and complicated by serious digestive haemorrhage. This latter required repeated blood transfusions. It was decided to perform mechanical aspiration thrombectomy by a 6°F catheter (Imager II, Boston Scientific, Natich, MA, USA) and angioplasty by a 9 mm balloon (EverCross, EV3, Plymouth, MN, USA) followed by direct thrombolysis through transjugular intrahepatic approach. Using a straight 4°F catheter (Imager II, Boston Scientific, Natich, MA, USA) positioned in superior mesenteric vein, rt-PA was administered with the following regimen: single bolus of 15 mg followed by infusion of 50 mg in 1 h and of 35 mg in 2 h. Unfractioned heparin was given simultaneously to maintain prothrombin time (PT) between 50 and 70 s. The procedure led to restoration of regular superior mesenteric vein patency (Fig. 2), and ascitic fluid resolved. The patient was then discharged with Seleparin 11400 UI $diem^{-1}$ (Seleparina, Italfarmaco S.p.A, Milan, Italy).

Treated with the appropriate dose of heparin, at 10-month follow-up CT, the vessel was patent and the patient did not experience any ascitis' recurrence. The patient died 15 days later owing to disease progression.

Discussion

Some series report successful treatment of portal vein stenosis by angioplasty in liver-transplant patients, but much less is known in the non-transplant population.[2] Transhepatic access to the portal system is generally easier than transjugular access, but there are concerns about a higher risk of peritoneal haemorrhage with that approach. In the present case, anastomotic venoplasty and stenting was successfully and safely performed by the transhepatic route as far as the hepatic tract could be closed by coil placement. Unfortunately, the decision to reduce anticoagulation before an RF ablation for a hepatic metastasis fostered a clinically relevant in-stent thrombosis, whose management was difficult until direct thrombolysis, performed via the transjugular approach to reduce the chance of a further peritoneal bleeding. Actually, there is no consensus on the optimal management strategy for an occluded venous bypass graft. Systemic thrombolysis is less invasive for the patient, and we sought to use it as first therapeutic strategy.

Our experience shows that endovascular treatment may be an effective option for post-surgical mesenteric vein stenosis, but anticoagulation plays an important role to

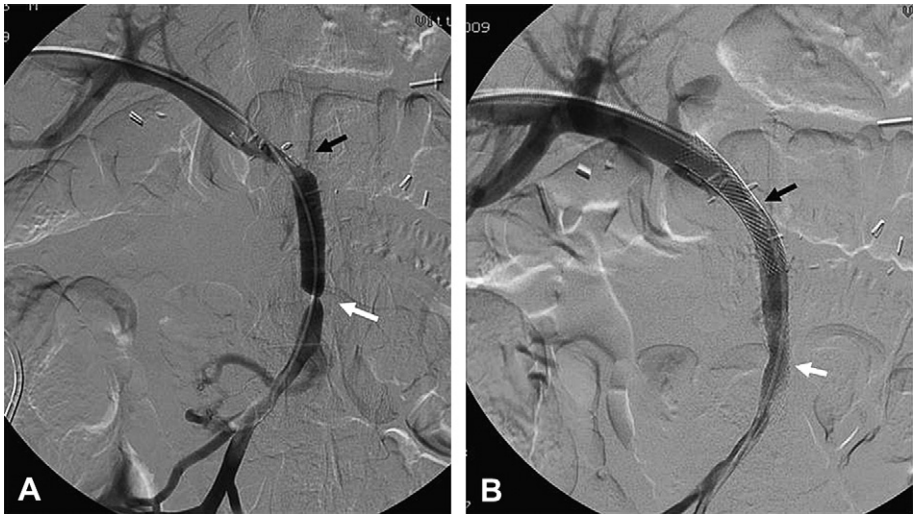

Figure 1 (A) Percutaneous transhepatic angiography demonstrates stenosis at the level of proximal (black arrow) and distal (white arrow) anastomoses of the PTFE graft. (B) Angiography after stent placement (black arrow proximal stent, white arrow distal stent) shows resolution of the stenosis.

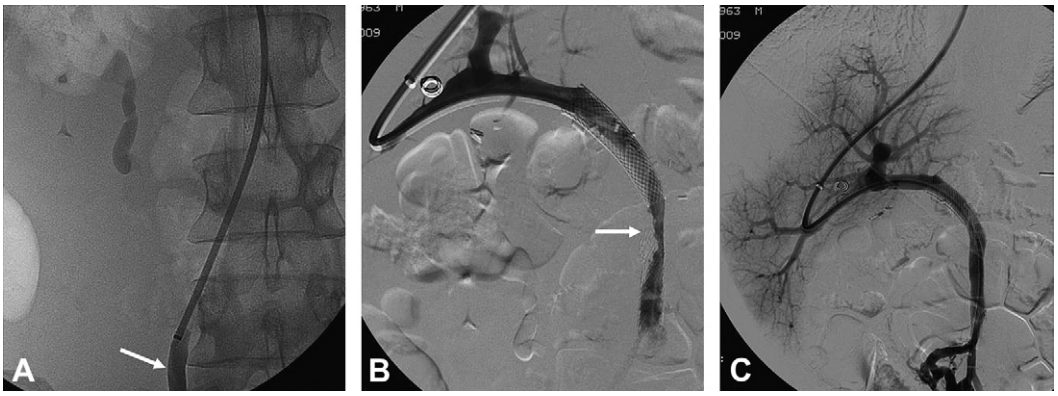

Figure 2 (A) Contrast injection in SMV (arrow) demonstrates complete vessel occlusion. (B) angiography after aspiration thrombectomy and angioplasty shows residual thrombus (arrow). (C) Complete resolution and calibre restoration after direct thrombolysis with rt-PA.

avoid in-stent thrombosis: in our case, a thrombosis occurred as soon as we halved the anticoagulation regimen.

To the best of our knowledge, no case of percutaneous endovascular treatment of mesenteric vein stenosis or thrombosis after pancreatic surgery with PTFE graft vascular reconstruction has been reported.

Conflict of Interest/Funding

None declared.

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